CLAIMS:

I claim:

1.   An optical network having nodes and optical links between nodes, comprising:

5   a plurality of data channels;

a control channel;

tokens which pass between nodes on the control channel;

wherein tokens advertise availability of receivers at a destination node and notify a source when a transmission did not succeed.

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2.   The network of Claim 1, wherein nodes evaluate the tokens to determine if a data payload is destined for and substantially simultaneously arriving at that node on one of the data channels

3.   The network of Claim 1, wherein the tokens notify a source when a transmission did not

15   succeed due to receiver preemption.

4.   The network of Claim 1, wherein each node of the network has fewer transmitters and receivers than data channels.

20   5.   The network of Claim 1, wherein each token carries a first field for advertising availability of receivers and a second field for notifying a source when a transmission does not succeed due to receiver preemption.

6.   The network of Claim 5, wherein the first field of a first token includes a count of the

25   available receivers at a destination node, and wherein the count is decremented by a transmitting node when the transmitting node claims a receiver at the destination node.

7.   The network of Claim 6, wherein if the count is negative, an intervening node between the transmitting node and the destination node will stop a data payload associated with the first

30   token.

8.   The network of Claim 1, wherein tokens comprise subsets each associated to a RX/TX waveband range and are treated collectively during configuration.

5   9.   The network of Claim 1, wherein contiguous paths between nodes are separately represented in the token

10.   The network of Claim 1, wherein transmitting nodes reserve apparently available receivers at downstream nodes without external confirmation.

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11.   The network of Claim 1, wherein tokens include a two bit field indicating communication link status, wherein a value (00) means the corresponding link is currently available, a value of (01) means the corresponding link is either a source link or an intermediate link between a source and destination, a value of (10) means the corresponding link is a destination link, and a value of

15   (11) means the link is the only link between the source node and the destination node.

12. An optical network comprising nodes and optical links between nodes, comprising:

a plurality of data channels;

a control channel;

tokens which pass between nodes on the control channel;

5 wherein nodes evaluate the tokens to determine if a data payload is destined for and substantially simultaneously arriving at that node on one of the data channels; and

wherein each token includes an indication of a path reservation and an indication of a for the path reservation.

10 13. The network of Claim 12, wherein tokens advertise availability of receivers at a destination node and notify a source when a transmission did not succeed.

14. The network of Claim 12, wherein each node of the network has fewer transmitters and receivers than data channels.

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15. The network of Claim 12, wherein path reservations can be overridden by higher urgency path reservations.

16. The network of Claim 12, wherein transmitting nodes reserve apparently available

20 receivers at downstream nodes without external confirmation.

17. The network of Claim 12, wherein the network comprises a ring topology.

18.   An optical network having nodes and optical links between nodes, comprising:

a plurality of data channels;

a control channel;

chords between selected nodes of the network;

5   tokens which pass between nodes on the control channel;

wherein nodes evaluate the tokens to determine if a data payload is destined for and simultaneously arriving at that node on one of the data channels;

wherein nodes and links comprise a ring topology, the default ring being a primary ring; and

10   wherein chords connect non-contiguous nodes of the ring topology.

19.   The network of Claim 18, wherein data may be diverted from the primary ring to bypass a node by sending the data across a chord.

15   20.   The network of Claim 18, further comprising switches at the nodes to divert data from the primary ring to a chord.

21.   The network of Claim 20, wherein a token associated with the diverted data remains on the primary ring and arrives substantially simultaneously with the associated token at a 20   destination node.